

=> file reg; d rn cn 15; d rn cn 13; d rn cn 16; d rn cn 14
FILE 'REGISTRY' ENTERED AT 14:26:04 ON 12 JUN 2003
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STRUCTURE FILE UPDATES: 11 JUN 2003 HIGHEST RN 529474-19-9
DICTIONARY FILE UPDATES: 11 JUN 2003 HIGHEST RN 529474-19-9

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PROPERTIES for more information. See STNote 27, Searching Properties
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<http://www.cas.org/ONLINE/STN/STNOTES/stnotes27.pdf>

L5 ANSWER 1 OF 1 REGISTRY COPYRIGHT 2003 ACS
RN 7664-41-7 REGISTRY
CN Ammonia (8CI, 9CI) (CA INDEX NAME)
OTHER NAMES:
CN Ammonia gas
CN Ammonia-14N
CN Nitro-Sil
CN R 717
CN Refrigerent R717
CN Spirit of Hartshorn

L3 ANSWER 1 OF 1 REGISTRY COPYRIGHT 2003 ACS
RN 1317-61-9 REGISTRY
CN Iron oxide (Fe3O4) (8CI, 9CI) (CA INDEX NAME)
OTHER NAMES:
CN AX 3000
CN B 6
CN B 6 (oxide)
CN Bayferrox 306
CN Bayferrox 316
CN Bayferrox 318
CN Bayferrox 330
CN Bayferrox 8010
CN Bayferrox Black 318
CN BK 5099
CN BL 10
CN BL 10 (oxide)
CN BL 100
CN BL 400
CN BL-SP
CN BM 611
CN Color MAT 220

CN E 335
CN E 335 (oxide)
CN EC 301
CN EC 371
CN EFV 100/200
CN EMG 900
CN EPP 2000
CN EPT 1002
CN EPT 2000
CN EPT 305
CN EPT 5000
CN Ethiops iron
CN Ferriferrous oxide
CN Ferriferrous oxide (Fe3O4)
CN Ferrix 8600
CN Ferroferric oxide
CN Ferrofluid EMG
CN Ferrofluid EMG 705
CN Ferrofluid EMG 707
CN Ferrofluid EMG 805
CN Ferrosoferric oxide
CN FW 17134
CN FW 1790
CN HR 370H
CN ICI 35-4
CN IO Black 318
CN Iron ferrite
CN Iron oxide
CN Iron oxide black
CN KBN 400
CN KFH-NA
CN LH
CN LP

ADDITIONAL NAMES NOT AVAILABLE IN THIS FORMAT - Use FCN, FIDE, or ALL for
DISPLAY

L6 ANSWER 1 OF 1 REGISTRY COPYRIGHT 2003 ACS

RN **7727-37-9** REGISTRY

CN Nitrogen (8CI, 9CI) (CA INDEX NAME)

OTHER NAMES:

CN Diatomic nitrogen
CN Dinitrogen
CN Molecular nitrogen
CN Nitrogen (N2)
CN Nitrogen gas
CN Nitrogen nutrition (plant)
CN Nitrogen-14

L4 ANSWER 1 OF 1 REGISTRY COPYRIGHT 2003 ACS

RN **1333-74-0** REGISTRY

CN Hydrogen (8CI, 9CI) (CA INDEX NAME)

OTHER NAMES:

CN Dihydrogen
CN Hydrogen (H2)
CN Hydrogen molecule
CN Mol. hydrogen
CN Molecular hydrogen
CN Orthohydrogen

CN Parahydrogen
CN Protium

=> file caplus; d que 117; d que 120
FILE 'CAPLUS' ENTERED AT 14:58:23 ON 12 JUN 2003
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FILE COVERS 1907 - 12 Jun 2003 VOL 138 ISS 24
FILE LAST UPDATED: 11 Jun 2003 (20030611/ED)

This file contains CAS Registry Numbers for easy and accurate substance identification.

L3	1	SEA	FILE=REGISTRY	ABB=ON	PLU=ON	1317-61-9/BI
L5	1	SEA	FILE=REGISTRY	ABB=ON	PLU=ON	7664-41-7/BI
L7	9646	SEA	FILE=CAPLUS	ABB=ON	PLU=ON	L5/PREP
L8	16096	SEA	FILE=CAPLUS	ABB=ON	PLU=ON	AMMONIA (L) PREP/RL
L9	20555	SEA	FILE=CAPLUS	ABB=ON	PLU=ON	L7 OR L8
L10	628	SEA	FILE=CAPLUS	ABB=ON	PLU=ON	L3/CAT
L11	4148	SEA	FILE=CAPLUS	ABB=ON	PLU=ON	IRON OXIDE (L) CAT/RL
L12	4365	SEA	FILE=CAPLUS	ABB=ON	PLU=ON	L10 OR L11
L13	178	SEA	FILE=CAPLUS	ABB=ON	PLU=ON	L9 AND L12
L16	970883	SEA	FILE=CAPLUS	ABB=ON	PLU=ON	PARTICLE
L17	17	SEA	FILE=CAPLUS	ABB=ON	PLU=ON	L16 AND L13
L5	1	SEA	FILE=REGISTRY	ABB=ON	PLU=ON	7664-41-7/BI
L18	48784	SEA	FILE=CAPLUS	ABB=ON	PLU=ON	PARTICLE/CT OR PARTICLE SIZE/CT
L19	3747	SEA	FILE=CAPLUS	ABB=ON	PLU=ON	L5/IMF OR AMMONIA (L) IMF/RL
L20	5	SEA	FILE=CAPLUS	ABB=ON	PLU=ON	L19 AND L18

=> s 117 or 120
L43 21 L17 OR L20

=> file ceaba-vt; d que 129
FILE 'CEABA-VTB' ENTERED AT 14:58:48 ON 12 JUN 2003
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FILE LAST UPDATED: 28 MAY 2003 <20030528/UP>
FILE COVERS 1966 TO DATE

L25 9018 SEA FILE=CEABA-VTB ABB=ON PLU=ON AMMONIA
L26 114 SEA FILE=CEABA-VTB ABB=ON PLU=ON L25 (5A) (PREP? OR MANUF?)
L27 49818 SEA FILE=CEABA-VTB ABB=ON PLU=ON CATALY?
L28 32477 SEA FILE=CEABA-VTB ABB=ON PLU=ON PARTICLE
L29 3 SEA FILE=CEABA-VTB ABB=ON PLU=ON L26 AND L27 AND L28

=> file wpid; d que 142

FILE 'WPIDS' ENTERED AT 14:58:56 ON 12 JUN 2003

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FILE LAST UPDATED: 9 JUN 2003 <20030609/UP>
MOST RECENT DERWENT UPDATE: 200336 <200336/DW>
DERWENT WORLD PATENTS INDEX SUBSCRIBER FILE, COVERS 1963 TO DATE

>>> NEW WEEKLY SDI FREQUENCY AVAILABLE --> see NEWS <<<

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SEE <http://www.derwent.com/dwpi/updates/dwpicov/index.html> <<<

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GUIDES, PLEASE VISIT:
http://www.derwent.com/userguides/dwpi_guide.html <<<

=> d que 142

L34 3316 SEA FILE=WPIDS ABB=ON PLU=ON AMMONIA (5A) (MANUF? OR PREP?)
L37 292908 SEA FILE=WPIDS ABB=ON PLU=ON CATALY?
L39 93907 SEA FILE=WPIDS ABB=ON PLU=ON PARTICLE (3A) SIZE
L41 25 SEA FILE=WPIDS ABB=ON PLU=ON L34 AND L39 AND L37
L42 5 SEA FILE=WPIDS ABB=ON PLU=ON L41 AND (CONTROLLED OR FLOW OR
RAPID OR COLUMN OR PROMOME)/TI

=> dup rem 143 129 142

FILE 'CAPLUS' ENTERED AT 14:59:24 ON 12 JUN 2003

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PROCESSING COMPLETED FOR L43

PROCESSING COMPLETED FOR L29

PROCESSING COMPLETED FOR L42

L44 28 DUP REM L43 L29 L42 (1 DUPLICATE REMOVED)
ANSWERS '1-21' FROM FILE CAPLUS
ANSWERS '22-24' FROM FILE CEABA-VTB
ANSWERS '25-28' FROM FILE WPIDS

=> d ibib ab 144 1-28

L44 ANSWER 1 OF 28 CAPLUS COPYRIGHT 2003 ACS DUPLICATE 1
ACCESSION NUMBER: 2000:34815 CAPLUS
DOCUMENT NUMBER: 132:95319
TITLE: Manufacture of ammonia
INVENTOR(S): Jacobsen, Claus J. H.; Boe, Michael
PATENT ASSIGNEE(S): Haldor Topsoe A/S, Den.
SOURCE: PCT Int. Appl., 10 pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2000001616	A1	20000113	WO 1999-EP4560	19990701
W: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM				
RW: GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG				
DK 9800892	A	20000327	DK 1998-892	19980702
DK 173917	B1	20020218		
CA 2336386	AA	20000113	CA 1999-2336386	19990701
AU 9947808	A1	20000124	AU 1999-47808	19990701
AU 757166	B2	20030206		
EP 1098847	A1	20010516	EP 1999-931233	19990701
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, FI				
JP 2002519296	T2	20020702	JP 2000-558028	19990701
RU 2189353	C1	20020920	RU 2001-103143	19990701
ZA 2000007805	A	20020322	ZA 2000-7805	20001221
NO 2000006686	A	20010302	NO 2000-6686	20001228
PRIORITY APPLN. INFO.:				
			DK 1998-892	A 19980702
			WO 1999-EP4560	W 19990701
AB The manuf. of ammonia by contacting an ammonia synthesis gas with ammonia catalyst particles arranged in a fixed bed, wherein the fixed bed comprises catalyst particles of the ammonia catalyst with a particle size being in the range of <1.5 mm and .gtoreq.0.2 mm., is described.				
REFERENCE COUNT:	6	THERE ARE 6 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT		

L44 ANSWER 2 OF 28 CAPLUS COPYRIGHT 2003 ACS
ACCESSION NUMBER: 2003:236965 CAPLUS
DOCUMENT NUMBER: 138:227455
TITLE: Analysis on ammonia synthesis over wustite-based iron catalyst
AUTHOR(S): Li, Xiaonian; Liu, Huazhang; Cen, Yaqing; Hu, Zhangneng
CORPORATE SOURCE: Institute of Catalysis, Zhejiang Key Laboratory of Heterogeneous Catalysis, Zhejiang University of Technology, Hangzhou, 310014, Peop. Rep. China
SOURCE: Chinese Journal of Chemical Engineering (2003), 11(1), 19-26
CODEN: CJCEEB; ISSN: 1004-9541
PUBLISHER: Chemical Industry Press

DOCUMENT TYPE: Journal
LANGUAGE: English

AB Wustite-based catalyst for ammonia synthesis exhibits extremely high activity and easy to redn. under a wide range of conditions. The reaction kinetics of ammonia synthesis can be illustrated perfectly by both the classical Temkin-Pyzhev and modified Temkin equations with optimized α of 0.5. The pre-exponent factors and activation energies at the pressures of 8.0 and 15.0 MPa are resp. $k_0 = 1.09 \times 10^{15}$, $7.35 \times 10^{14} \text{ Pa}^{0.5} \cdot \text{s}^{-1}$, and $E = 156.6$, $155.5 \text{ kJ} \cdot \text{mol}^{-1}$ derived from the classical Temkin-Phyzhev equation, as well as $k_0 = 2.45 \times 10^{14}$, $1.83 \times 10^{14} \text{ Pa}^{0.5} \cdot \text{s}^{-1}$, and $E = 147.7$, $147.2 \text{ kJ} \cdot \text{mol}^{-1}$ derived from the modified Temkin equation. Although the degree of redn. under isothermal condition is primarily dependent upon temp., low pressure seems to be imperative for redn. under high temp. and low space velocity to be considered as a high activity catalyst. The redn. behavior with dry feed gas can be illustrated perfectly by the shrinking-sphere-**particle** model, by which the redn.-rate consts. of $4248 \exp(-71680/RT)$ and $644 \exp(-87260/RT)$ were obtained for the powder (0.045-0.054 mm) and irregular shape (nominal diam. 3.17 mm) catalysts resp. The significant effect of **particle** size on redn. rate was obsd., therefore, it is important to take into account the influence of **particle** size on redn. for the optimization of redn. process in industry.

REFERENCE COUNT: 29 THERE ARE 29 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L44 ANSWER 3 OF 28 CAPLUS COPYRIGHT 2003 ACS

ACCESSION NUMBER: 2000:590263 CAPLUS

DOCUMENT NUMBER: 133:165951

TITLE: Petrochemical synthesis and/or regeneration of ultradispersed catalysts

AUTHOR(S): Vissokov, Gheorgi P.

CORPORATE SOURCE: Inst. of Electronics, Bulgarian Academy of Sciences, Sofia, 1784, Bulg.

SOURCE: Preprints - American Chemical Society, Division of Petroleum Chemistry (2000), 45(3), 396-400
CQDEN: ACPCAT; ISSN: 0569-3799

PUBLISHER: American Chemical Society, Division of Petroleum Chemistry

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Novel work was reported for the use of plasma-chem. reactions in the prepn., activation, and regeneration of catalysts, esp. for ultradispersed catalysts. Topics discussed include: (1) thermodyn. and kinetics of plasma-chem. reactions, (2) three-dimensional models of motion, heating, melting, vaporization, and thermal destruction of micron-sized particles of the catalysts, (3) mechanisms of evapn. of micron-sized **particles** and of condensation of catalyst phases, (4) parameter correlation of plasma processes and catalyst dispersity, (5) optimal plasma parameters, and (6) property characterization of plasma-prepd. ultradispersed catalysts. Such catalysts are characterized by high sp. surface areas, homogeneous compns., and high catalytic activities (e.g., related to high active surface areas and crystal defects). Steam reforming of methane and ammonia synthesis were given as examples.

REFERENCE COUNT: 16 THERE ARE 16 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L44 ANSWER 4 OF 28 CAPLUS COPYRIGHT 2003 ACS

ACCESSION NUMBER: 1999:344889 CAPLUS

DOCUMENT NUMBER: 130:340175

#4

TITLE: Ammonia oxidation catalysts
 INVENTOR(S): Crewdson, Bernard John; Ward, Andrew Mark; Dunne, Michael David
 PATENT ASSIGNEE(S): Imperial Chemical Industries Plc, UK
 SOURCE: PCT Int. Appl., 19 pp.
 CODEN: PIXXD2
 DOCUMENT TYPE: Patent
 LANGUAGE: English
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 9925650	A1	19990527	WO 1998-GB3386	19981106
W: AU, BG, BR, CA, CZ, HU, ID, IL, JP, KR, MX, NO, PL, RO, RU, UA, US RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE				
CA 2306780	AA	19990527	CA 1998-2306780	19981106
AU 9910460	A1	19990607	AU 1999-10460	19981106
EP 1034134	A1	20000913	EP 1998-952918	19981106
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, FI				
ZA 9810270	A	19990519	ZA 1998-10270	19981110
NO 2000002522	A	20000516	NO 2000-2522	20000516
PRIORITY APPLN. INFO.: GB 1997-24310 A 19971119 WO 1998-GB3386 W 19981106				

AB An ammonia oxidn. catalyst cartridge unit comprises a pair of retaining meshes spaced apart by <50 mm defining an enclosure filled with a random packed mass of **particles** of a compn. comprising oxides of .gtoreq.1 metal selected from manganese, iron, nickel and cobalt, esp. cobalt and .gtoreq.1 element A selected from rare earths and yttrium in such proportions that the element A to cobalt at. ratio is in the range of 0.8 to 1.2. The catalyst **particles** have a min. dimension of at least 0.5 mm and a max. dimension of not more than 5 mm, and the spacing between the meshes is at least 4 times, but not more than 50 times, the max. dimension of the **particles**. The unit may extend across the ammonia oxidn. reactor cross section or a catalyst cartridge may comprise a grid or apertured plate, extending across the cross section of the reactor, with a unit as aforesaid in each aperture.

REFERENCE COUNT: 7 THERE ARE 7 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L44 ANSWER 5 OF 28 CAPLUS COPYRIGHT 2003 ACS
 ACCESSION NUMBER: 1999:273618 CAPLUS
 DOCUMENT NUMBER: 130:325763
 TITLE: Polyorganosiloxane fine granules and production methods therefor
 INVENTOR(S): Adachi, Tatsuhiko; Takagi, Hidekazu; Okamoto, Naoki
 PATENT ASSIGNEE(S): Ube Nitto Kasei Co., Ltd., Japan
 SOURCE: Jpn. Kokai Tokkyo Koho, 8 pp.
 CODEN: JKXXAF
 DOCUMENT TYPE: Patent
 LANGUAGE: Japanese
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 11116680	A2	19990427	JP 1998-223789	19980807
PRIORITY APPLN. INFO.: JP 1997-213271 19970807				
OTHER SOURCE(S): MARPAT 130:325763				

AB Alkoxysilanes are treated with water contg. ammonia and/or amines and optionally solvents, mixed with addnl. ammonia and/or amines, and aged to prep. polyorganosiloxanes having av. granular diam. $\geq 5 \mu\text{m}$ and coeff. of variation (CV) of granular size distribution $\leq 3.0\%$. Thus, methyltrimethoxysilane was added into aq. ammonia, mixed with addnl. aq. ammonia, aged, sepd., washed, and dried to prep. polymethylsilsesquioxane granules having av. diam. $5.4 \mu\text{m}$ and CV 1.23%.

L44 ANSWER 6 OF 28 CAPLUS COPYRIGHT 2003 ACS

ACCESSION NUMBER: 1999:440682 CAPLUS
DOCUMENT NUMBER: 131:131885
TITLE: A density-functional study of the interaction of nitrogen with ruthenium clusters
AUTHOR(S): Dooling, David J.; Nielsen, Robert J.; Broadbelt, Linda J.
CORPORATE SOURCE: Center for Catalysis and Surface Science, Department of Chemical Engineering, Northwestern University, Evanston, IL, 60208-3120, USA
SOURCE: Chemical Engineering Science (1999), 54(15-16), 3399-3409
CODEN: CESCAC; ISSN: 0009-2509
PUBLISHER: Elsevier Science Ltd.
DOCUMENT TYPE: Journal
LANGUAGE: English

AB Recently, the synthesis of ammonia over ruthenium-based catalysts has become an industrially viable process. Unfortunately, investigations of ammonia synthesis over ruthenium are scarce, particularly in comparison to the no. of studies carried out over iron. To begin to fill this void, we have performed a series of electronic d.-functional theory (DFT) calcs. to investigate the effect of particle size and surface structure on ammonia synthesis over ruthenium. Our study has focused on the dissociative adsorption of dinitrogen, which is thought to be the rate-detg. step in the synthesis, on both single-crystal surfaces and spherical clusters of ruthenium. The equil. adsorbate geometries were remarkably similar on both the single-crystal surfaces and the spherical clusters studied. The binding energy of dinitrogen in the end-on state exhibited a strong dependence on ruthenium surface atom coordination, being much stronger on atoms with low coordination. The main difference between the two single-crystal surfaces studied was the ability of the open Ru(11-20) face to stabilize a low-energy side-on dinitrogen state, while the close-packed Ru(0001) face could not. It is likely that this stable side-on state provides a low-energy dissocn. pathway.

REFERENCE COUNT: 54 THERE ARE 54 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L44 ANSWER 7 OF 28 CAPLUS COPYRIGHT 2003 ACS

ACCESSION NUMBER: 1999:123360 CAPLUS
DOCUMENT NUMBER: 130:184475
TITLE: Mossbauer study on the inhibition of promoters on the disproportionation of Fe-xO catalyst for ammonia synthesis
AUTHOR(S): Li, Xiaonian; Liu, Huazhang; Xu, Yusheng; Chen, Songying
CORPORATE SOURCE: Zhejiang Province Key Laboratory of Heterogeneous Catalysis, Catalysis Institute of Zhejiang University of Technology, Hangzhou, 310014, Peop. Rep. China
SOURCE: Cuihua Xuebao (1999), 20(1), 76-80
CODEN: THHPD3; ISSN: 0253-9837
PUBLISHER: Kexue Chubanshe
DOCUMENT TYPE: Journal
LANGUAGE: Chinese

AB Fel-xO precursor is thermodynamically unstable below 570.degree., but the disproportionation behavior of the precursor is inhibited by the promoters which are added into the Fel-xO catalyst. When calcium oxide was added into the Fel-xO catalyst, calcium ions entered into the Fel-xO crystal lattice, decreased the concn. of the defect sites in Fel-xO crystal and improved the stability of the Fel-xO crystal. The existence of calcium oxide in the Fel-xO catalyst can get rid of the occurrence of the precursor disproportionation. The redn. mechanism of Fel-xO catalyst promoted by calcium oxide or promoters including calcium oxide is that Fel-xO is reduced to .alpha.-Fe directly. But the redn. of the Fel-xO catalyst unpromoted by calcium oxide is related with the redn. conditions. A part of Fel-xO is disproportionated to Fe3O4 and .alpha.-Fe at first, and then Fe3O4 is reduced to .alpha.-Fe in the case of large sized catalyst **particle** or long redn. time; another part of Fel-xO is reduced to .alpha.-Fe directly.

L44 ANSWER 8 OF 28 CAPLUS COPYRIGHT 2003 ACS

ACCESSION NUMBER: 1997:121478 CAPLUS
DOCUMENT NUMBER: 126:134654
TITLE: Silicon nitride ceramic powder, and its manufacture
INVENTOR(S): Yamada, Tetsuo; Yamao, Takeshi
PATENT ASSIGNEE(S): Ube Industries, Ltd., Japan
SOURCE: Ger. Offen., 14 pp.
CODEN: GWXXBX
DOCUMENT TYPE: Patent
LANGUAGE: German
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
DE 19630114	A1	19970130	DE 1996-19630114	19960725
JP 09040406	A2	19970210	JP 1995-210193	19950727
JP 3282456	B2	20020513		

PRIORITY APPLN. INFO.: JP 1995-210193 A 19950727

AB The Si3N4 powder has av. particle size .gtoreq.5 .mu.m, and contains fines .ltoreq.2 .mu.m .ltoreq.10 wt.%, and particles .gtoreq.30 .mu.m .ltoreq.10 wt.%, and particle size distribution curve giving a ratio between the cumulative 10% size and cumulative 90% size .ltoreq.5. The powder is manufd. by calcining N-contg. silane powder and/or amorphous Si3N4 powder, each having bulk d. .ltoreq.0.15 g/cm3, at .gtoreq.1450 but <1800.degree. in N-contg. inert gas having N partial pressure .gtoreq.0.03 MPa, heating the material at a rate of .ltoreq.40.degree./h to a temp. within the the range detd. by the temp. at which a crystallinity of 1% is obtained and the temp. at which a crystallinity of 10% is obtained.

L44 ANSWER 9 OF 28 CAPLUS COPYRIGHT 2003 ACS

ACCESSION NUMBER: 1991:151435 CAPLUS
DOCUMENT NUMBER: 114:151435
TITLE: A method of performing a catalyzed reaction and a reactor for use with this method
INVENTOR(S): Van Wingerden, Antonius Johannes; Boon, Andries Quirin Maria; Geus, John Wilhelm
PATENT ASSIGNEE(S): VEG-Gasinstituut N. V., Neth.
SOURCE: Eur. Pat. Appl., 16 pp.
CODEN: EPXXDW
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
EP 416710	A1	19910313	EP 1990-202359	19900905
EP 416710	B1	19940921		
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE				
NL 8902250	A	19910402	NL 1989-2250	19890908
AU 9062002	A1	19910314	AU 1990-62002	19900830
AU 628636	B2	19920917		
CA 2024524	AA	19910309	CA 1990-2024524	19900904
ES 2064602	T3	19950201	ES 1990-202359	19900905
RU 2013118	C1	19940530	RU 1990-4831053	19900906
JP 03165831	A2	19910717	JP 1990-238824	19900907
JP 3150687	B2	20010326		
US 5366719	A	19941122	US 1993-107466	19930817
PRIORITY APPLN. INFO.:			NL 1989-2250	A 19890908
			US 1990-579357	B1 19900907

AB In a method of conducting a chem. reaction in the presence of a heterogeneous catalyst, a feedstock is passed through a catalytic reactor, the reactor comprising a solid reactor bed with a catalytically active material present thereon, and .gtoreq.1 heat supplying and/or discharging reactor wall, and in which the catalyst bed consists of elementary particles of material sintered together and to 1 side of the wall, there being no sintered material present on the other side of the reactor wall, and in which the max. distance in meters of any point of the reactor bed to a nearest heat supplying and/or discharging wall is detd. by a given formula. More specifically, the chem. reaction is catalytic combustion, the prepn. of ethylene oxide, NH3 synthesis, or selective H2S oxidn in which a gas mixt. contains >3% by vol. H2S which is substantially converted to S.

L44 ANSWER 10 OF 28 CAPLUS COPYRIGHT 2003 ACS

ACCESSION NUMBER: 1991:495372 CAPLUS

DOCUMENT NUMBER: 115:95372

TITLE: Ammonia synthesis in a magnetically fluidized powdery catalyst bed under a low pressure

AUTHOR(S): Zrunchev, I.; Popova, T.

CORPORATE SOURCE: Higher Inst. Chem. Technol., Sofia, 1156, Bulg.

SOURCE: Powder Technology (1991), 64(1-2), 175-81

CODEN: POTE BX; ISSN: 0032-5910

DOCUMENT TYPE: Journal

LANGUAGE: English

AB In NH3 synthesis on Fe catalysts, the relative activity of the catalysts in an immobile magnetically stabilized bed was analyzed in relation to their particle size. The rate const. of the reaction increased 10-fold when the catalyst grains were cut into 0.15-mm pieces. The quantity which is proposed for the Thiele no. is the mean capillary length instead of the particle radius. The necessity of applying powdery catalysts in heterogeneous processes with a view to achieving max. conversion degree is pointed out. Magnetically stabilized beds are applicable at relatively high linear rates. Powdery catalyst beds fluidized in a magnetic field of moderate intensity allow NH3 synthesis at low pressures. A flow sheet of the process is proposed. The gas circulation is performed using an injector.

L44 ANSWER 11 OF 28 CAPLUS COPYRIGHT 2003 ACS

ACCESSION NUMBER: 1989:460506 CAPLUS

DOCUMENT NUMBER: 111:60506

TITLE: Ammonia preparation with fluidized catalysts

INVENTOR(S): Shannahan, Cornelius E.

PATENT ASSIGNEE(S): USA

SOURCE: U.S., 10 pp. Cont.-in-part of U.S. Ser. No. 8,776.

CODEN: USXXAM
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 4822586	A	19890418	US 1988-230312	19880809
CA 1298063	A1	19920331	CA 1987-544522	19870814
EP 355259	A1	19900228	EP 1989-106862	19890417

R: AT, BE, CH, DE, ES, FR, GB, IT, LI, NL
PRIORITY APPLN. INFO.:
US 1986-866203 19860521
US 1987-8776 19870130
US 1988-230312 19880809

AB ~~NH3 is synthesized~~ by contacting H and N with an activated Fe catalyst in a fluidized state in a fluidized bed maintained at 600-1000.degree.F and 25-90 atm. in the reaction zone. The fluidized bed is maintained under substantially isothermal conditions by flow of coolant liq. through heat exchange coils disposed in the bed. The activated Fe catalysts have an av. particle diam. of .ltoreq.0.25 mm. Because of the isothermal operating conditions and the use of small catalyst **particles**, the catalytic activity of the catalyst is 3 times greater than that of the identical catalyst used in a conventional fixed bed.

L44 ANSWER 12 OF 28 CAPLUS COPYRIGHT 2003 ACS
ACCESSION NUMBER: 1988:457585 CAPLUS
DOCUMENT NUMBER: 109:57585
TITLE: Process for producing granular diammonium phosphate
INVENTOR(S): Fairchild, William D.
PATENT ASSIGNEE(S): Conserv, Inc., USA
SOURCE: U.S., 7 pp.
CODEN: USXXAM
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 4744965	A	19880517	US 1986-901267	19860828

PRIORITY APPLN. INFO.:
OTHER SOURCE(S): CASREACT 109:57585
US 1986-901267 19860828

AB In (NH4)2HPO4 manuf. as 2-4 mm granules, anhyd. NH3 and aq. H3PO4 are reacted to form a slurry of (NH4)H2PO4 and (NH4)2HPO4. The slurry is further reacted with more anhyd. NH3 in a rotating drum granulator-reactor to complete the prodn. of (NH4)2HPO4. About 30-50% of the dried (NH4)2HPO4 in a rotating drum dryer is diverted back to the granulator-reactor. The remaining 50-70% of the dried product is transferred to the classifying means to sep. the oversize, i.e. +5 mesh Tyler, and undersize, i.e. +7 mesh Tyler, or fines from the desired 2-4 mm product. The process is economical and the diversion step avoids screen overloading and gives .apprx.90% of the granules with granule size of 2-4 mm compared to only .apprx.60% of granules resulting from a conventional process without the diversion step.

L44 ANSWER 13 OF 28 CAPLUS COPYRIGHT 2003 ACS
ACCESSION NUMBER: 1989:102630 CAPLUS
DOCUMENT NUMBER: 110:102630
TITLE: Ammonia synthesis catalyst containing cerium oxide

INVENTOR(S): Lin, Weiming; Huang, Chuanrong; Gan, Shifan
PATENT ASSIGNEE(S): Huanan Polytechnical College, Peop. Rep. China
SOURCE: Faming Zhuanli Shenqing Gongkai Shuomingshu, 10 pp.
CODEN: CNXXEV
DOCUMENT TYPE: Patent
LANGUAGE: Chinese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
CN 86107630	A	19880518	CN 1986-107630	19861105
CN 1006767	B	19900214		

PRIORITY APPLN. INFO.: CN 1986-107630 19861105

AB A catalyst for NH₃ synthesis is manufd. by mixing Fe₃O₄ 93-97, CaO 1.3-2.5, Al₂O₃ 1.3-2.5, K₂O 0.3-1.0, and CeO₂ 0.4-1.0%, m. 1600.degree., adjusting the Fe²⁺/Fe³⁺ ratio to 0.55 +/- 0.02 by adding Fe metal, cooling rapidly to room temp., and pulverizing to give particle size 2.2-3.3 mm. Ce(NO₃)₃, Ce(CO₃)₂, or Ce(C₂O₄)₂ can replace CeO₂; KNO₃ or K₂CO₃ can replace K₂O; and CaCO₃ can replace CaO in the manuf. of the catalyst. The catalyst has improved thermal stability, low tendency of poisoning, long working life, and high catalytic activity, even under low temp. and low pressure.

L44 ANSWER 14 OF 28 CAPLUS COPYRIGHT 2003 ACS

ACCESSION NUMBER: 1987:20658 CAPLUS
DOCUMENT NUMBER: 106:20658
TITLE: Granulated iron oxide catalyst with improved activity for ammonia synthesis
INVENTOR(S): Podol'skii, I. L.; Zozulya, V. Yu.; Alekseev, A. M.; Kuznetsov, L. D.; Rabina, P. D.; Sergeev, S. P.; Malakhov, A. I.; Lur'e, B. I.; Kukso, V. M.; et al.
PATENT ASSIGNEE(S): USSR
SOURCE: Fr. Demande, 18 pp.
CODEN: FRXXBL
DOCUMENT TYPE: Patent
LANGUAGE: French
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
FR 2572955	A1	19860516	FR 1984-13725	19840906
FR 2572955	B1	19870227		

PRIORITY APPLN. INFO.: FR 1984-13725 19840906

AB An NH₃ synthesis catalyst comprises grains of Fe oxide and an alk. metal aluminate strengthening component and may comprise Fe oxide particles of 0.01-0.5 .mu. size, a clay mineral, or the product from the thermal treatment of a clay mineral. The catalyst constituents are Fe oxide 87.0-96.4, alkali metal aluminate 3.0-6.0, clay 0.1-6.0 and other strengthening agent(s) 0.5-1.0 wt.%. The catalyst has low hygroscopicity, a low loss of compression resistance, and high activity. The catalyst is prepd. by mixing a granulated Fe oxide with an aq. soln. of an alkali metal aluminate having a d. of 1.49-1.6 g/cm³; the catalyst is molded and the strengthening agent(s) introduced. The catalyst is thermally treated at 300-600.degree. and molded. Thus, a catalyst block with exterior diam. 3.0, interior diam. 1.0, and height 3.0 m was made from Fe oxide grains of 1-3 mm. An aq. soln. of K aluminate (d. 1.54 g/cm³) 1.58 tons (3 wt.% dry wt.) and bentonite 0.83 ton (1.6 wt.%) was added to a mixing drum contg. an Fe oxide-based catalyst 52.0 tons (96.4 wt.%). The catalyst had the compn. FeO 36.0, Fe₂O₃ 56.6, K₂O 0.7, Al₂O₃

3.5, CaO 2.5, and SiO₂ 0.7 wt.%. The catalyst was molded and heated in an elec. furnace at 300.degree. for 3 h. It had a compressive strength of 5.8 MPa and produced 20.7 vol.% NH₃ at 475.degree., 29.4 MPa and a space velocity of 30,000 h⁻¹.

L44 ANSWER 15 OF 28 CAPLUS COPYRIGHT 2003 ACS

ACCESSION NUMBER: 1986:231261 CAPLUS

DOCUMENT NUMBER: 104:231261

TITLE: Physics of microparacrystals and its technological importance for ammonia catalysis

AUTHOR(S): Hosemann, R.; Hentschel, M. P.

CORPORATE SOURCE: Gruppe Parakristallforsch., Bundesanst. Materialpruefung, Berlin, Fed. Rep. Ger.

SOURCE: Vakuum-Technik (1986), 35(1), 3-9

CODEN: VAKTAY; ISSN: 0042-2266

DOCUMENT TYPE: Journal; General Review

LANGUAGE: German

AB A review with 19 refs. is given of microparacrystals, the small **particles** that make up most colloids. The importance of Fe₃O₄-Al₂O₃ microparacrystals as an NH₃ synthesis catalyst is discussed.

L44 ANSWER 16 OF 28 CAPLUS COPYRIGHT 2003 ACS

ACCESSION NUMBER: 1988:428271 CAPLUS

DOCUMENT NUMBER: 109:28271

TITLE: Method of obtaining a ferrous catalyst for synthesis of ammonia

INVENTOR(S): Dworak, Edward; Golebiowski, Andrzej; Stolecki, Kazimierz

PATENT ASSIGNEE(S): Instytut Nawozow Sztucznych, Pulawy, Pol.

SOURCE: Pol., 3 pp.

CODEN: POXXA7

DOCUMENT TYPE: Patent

LANGUAGE: Polish

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PL 131490	B1	19841130	PL 1980-228423	19801212

PRIORITY APPLN. INFO.: PL 1980-228423 19801212

AB In a method for prepn. of these catalysts contg. Fe oxides and promoters, such as Al₂O₃, SiO₂, CaO, K₂O, TiO₂, and others, a melt of Fe with Al and Si is prepd., contg. 50-100% of the metal components of the catalyst. Ferrosilicon can also be used as the raw material for melt prodn. Rods 10-20 mm in diam. are formed from melts and are baked in an O atm. The oxidn. product is cooled, crushed into particles <3 mm, and mixed mech. with the remaining oxide-type activators. The suggested proportions of these activators per 92.8 kg of the oxidized melt are: K₂O (as KNO₃) 1.4 kg, CaO 1.95 kg, and MgO 0.45 kg. Finally, the total mass is melted again, poured into steel tubs to cool, and the solidified alloy is crushed, screened, sepd. into several grain size fractions, and used directly as a ferrous catalyst for NH₃ synthesis. In view of the fact that the FeAlSi melt usually contains S, which acts as a catalyst poison, S is removed from this melt by the addn. of Ce and/or a Ce alloy contg. La, Nd, and Pr, in an amt. of 0.5-2 kg per ton of the melt. Very stable oxysulfides and sulfides of lanthanides formed in this process gather on the surface of the melt and are sepd.

L44 ANSWER 17 OF 28 CAPLUS COPYRIGHT 2003 ACS

ACCESSION NUMBER: 1986:536289 CAPLUS

DOCUMENT NUMBER: 105:136289

TITLE: Catalytic processes in magnetic structured catalyst beds. New trend of catalysis
AUTHOR(S): Zrunchev, I.; Popova, T.
CORPORATE SOURCE: Higher Inst. Chem. Technol., Sofia, Bulg.
SOURCE: Int. Congr. Catal., [Proc.], 8th (1985), Meeting Date 1984, Volume 4, IV847-IV858. Verlag Chemie: Weinheim, Fed. Rep. Ger.
CODEN: 55DBAG

DOCUMENT TYPE: Conference

LANGUAGE: English

AB The fluidization of the ferromagnetic catalysts under the effect of a relatively homogeneous magnetic field, collinearly oriented by the direction of the fluid, integrates the basic advantages of the packed and fluidized beds. An immobile, fluidlike state is set up. The bubbling and circulation of **particles** is eliminated. The accessible geometric surface is increased by 25-30%. The method eliminates the diffusion resistance in the pores of the catalyst and increases its selectivity. The intensity of the outside magnetic field is limited to the value of magnetic satn. of the catalyst. The mech. strength of the contact masses does not limit the application of magnetic structural beds. An isothermal bed is established for the ratio $h : D$.ltoreq. 4. The investigations of the hydrogenation of N and CO, the conversion of CO and NH3 oxidn. indicate an increase of the reaction rate of .ltoreq.6 times with U/U_k .ltoreq.30, where U is the gas velocity and V_k the min. fluidization velocity.

L44 ANSWER 18 OF 28 CAPLUS COPYRIGHT 2003 ACS

ACCESSION NUMBER: 1984:141462 CAPLUS

DOCUMENT NUMBER: 100:141462

TITLE: Magnetic structurization of catalyst beds (MSCB) - a new direction of catalysts

AUTHOR(S): Zrunchev, I.; Popova, T.

CORPORATE SOURCE: Higher Chemikotechnol Inst., Sofia, Bulg.

SOURCE: Geterogennyi Kataliz (1983), 5th, Pt. 2, 417-22

CODEN: GEKADD; ISSN: 0254-4946

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The structurization of catalyst beds fluidized in a gradientless, solenoidal, d.c. magnetic field was studied in the synthesis of NH3 and C2-C6 alcs. and CO conversion. Bubbles are absent, the main advantages of fixed and fluidized beds are combined at a fixed ratio of the **particle** potential and kinetic energies, the hydraulic resistance is const., and the catalysis is faster than in fixed and fluidized beds and more selective.

L44 ANSWER 19 OF 28 CAPLUS COPYRIGHT 2003 ACS

ACCESSION NUMBER: 1982:623905 CAPLUS

DOCUMENT NUMBER: 97:223905

TITLE: Metal oxide catalyst composition

INVENTOR(S): Topham, Susan Ann

PATENT ASSIGNEE(S): Imperial Chemical Industries PLC, UK

SOURCE: Eur. Pat. Appl., 12 pp.

CODEN: EPXXDW

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
EP 60622	A1	19820922	EP 1982-300749	19820215

EP 60622 B1 19860507
R: BE, DE, FR, GB, IT, NL, SE
NO 8200857 A 19820920 NO 1982-857 19820316
NO 159435 B 19880919
NO 159435 C 19940504
DK 8201193 A 19820919 DK 1982-1193 19820317
DK 158876 B 19900730
DK 158876 C 19901231
JP 57167738 A2 19821015 JP 1982-43678 19820318
JP 03010374 B4 19910213
US 4797383 A 19890110 US 1985-721137 19850409
NO 9103585 A 19820920 NO 1991-3585 19910911

PRIORITY APPLN. INFO.:

GB 1981-8409 19810318
US 1982-352059 19820224
NO 1982-857 19820316
US 1983-563546 19831221

AB A metal oxide catalyst compn. is in the form of **particles** having at least 1 face formed by solidification of a melt in contact with a surface and preferably having at least 1 channelled surface whereby the pressure drop through a bed of such **particles** is limited. The **particles** are made preferably by casting the melt and fracturing the resulting layer. Such a compn. comprising Fe oxide is a precursor for an NH₃-synthesis catalyst. E.g., a mixt. of finely powd. compn. of Al₂O₃ 2.4, CaO 1.4, K₂O 1.0, SiO₂ 0.4, and Fe₃O₄ 94.8% by wt. was melted at 1600.degree. and the melt cast in corrugated trays. The corrugations were 2mm deep and 7mm wide, sepd by 1mm. The solidified layer was crushed and sieved, and the **particles** were dild. by SiO₂ chips and used as catalyst in the reaction of 3:1 H₂:N₂ at 475.degree.. The catalyst activity is 6-7% higher than that of com. catalysts.

L44 ANSWER 20 OF 28 CAPLUS COPYRIGHT 2003 ACS

ACCESSION NUMBER: 1978:107474 CAPLUS
DOCUMENT NUMBER: 88:107474
TITLE: Granular material and its use as a catalyst
INVENTOR(S): Harbord, Norman Henry
PATENT ASSIGNEE(S): Imperial Chemical Industries Ltd., UK
SOURCE: Brit., 6 pp.
CODEN: BRXXAA
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
GB 1484864	A	19770908	GB 1973-57321	19741125
PRIORITY APPLN. INFO.:			GB 1973-57321	19741125

AB The uniform title granules which are useful as catalysts for NH₃ manuf. have low bulk d., high pore vol., and good mech. properties and were manufd. by crushing a solidified fused metal oxide compn. contg. >70% Fe₃O₄ and by wet granulating a particle size fraction which was then dried and sintered. Thus, a Fe₃O₄ compn. contg. Al₂O₃ 2.5, CaO 2.0, K₂O 0.8, MgO 0.3, and SiO₂ 0.4%, and traces of TiO₂, V₂O₅, and ZrO₂, crushed and sieved to have a **particle** size of 30-300-British sieve std., was wet-balled into 0.125-0.375-in.-granules which were dried, sintered 6 min at 1430.degree., tumbled, and sieved to remove undersize particles.

L44 ANSWER 21 OF 28 CAPLUS COPYRIGHT 2003 ACS

ACCESSION NUMBER: 1967:520455 CAPLUS
DOCUMENT NUMBER: 67:120455

TITLE: Method of production of the catalyst for ammonia synthesis
INVENTOR(S): Jodko, Czeslaw
PATENT ASSIGNEE(S): Instytut Nawozow Sztucznych
SOURCE: Pol., 2 pp.
CODEN: POXXA7
DOCUMENT TYPE: Patent
LANGUAGE: Polish
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PL 53100		19670510	PL	19650311

AB The catalyst is prepd. by melting forge scale ($\text{Fe}_2\text{O}_3/\text{FeO} < 1.3$) with some activating agents and stabilizers, cooling the melt, and then crushing it to obtain a desired size of particles. Carbon steel forge scale is free of S and other impurities and thus better than natural magnetite. However, the scale is mixed with natural or made magnetite before melting (or oxidized instead) if $\text{Fe}_2\text{O}_3/\text{FeO}$ is < 1.3 . The catalyst obtained was composed of Al_2O_3 3, CaO 2, and K₂O 1.2 wt. %; particle size 2-3 mm.

L44 ANSWER 22 OF 28 CEABA-VTB COPYRIGHT 2003 DECHEMA

ACCESSION NUMBER: 1998(07):3914 CEABA-VTB FILE SEGMENT V

DOCUMENT NUMBER: CEABA: 1998:8445891

TITLE: Anionic ruthenium cluster dipotassium tridecacarbonyltetraruthenate as precursor of **catalytically** active ruthenium **particles** and potassium promoter. New efficient ammonia synthesis **catalysts** based on supported $\text{K}_2(\text{Ru}_4(\text{CO})_{13})$

AUTHOR: Shur, V. B.; Yunusov, S. M.; Moroz, B. L.; Ivanova, A. S.; Likholobov, V. A. (Russian Acad. Sci., Moscow, 117813, Russia)

SOURCE: J. Mol. Catal. A: Chem. (1998) 132(2/3), p.263-265
CODEN: JMCCF2 ISSN: 1381-1169

DOCUMENT TYPE: Journal

LANGUAGE: English

AB New efficient potassium-promoted **catalysts** were developed for **ammonia** synthesis. For the **preparation** of the **catalysts**, $\text{K}_2(\text{Ru}_4(\text{CO})_{13})$ was used as a precursor of both **catalytically** active metal **particles** and potassium promoter, whereas magnesium oxide and graphite-like active carbon CFC-I were used as supports. The **catalysts** **catalysed** ammonia synthesis at 250.degree.C and 1 atm. Their activity at 300-400.degree.C and 1 atm exceeded that of an industrial ammonia synthesis **catalyst** (SA-1). The $\text{K}_2(\text{Ru}_4(\text{CO})_{13})$ **catalyst** on MgO was particularly effective.

L44 ANSWER 23 OF 28 CEABA-VTB COPYRIGHT 2003 DECHEMA

ACCESSION NUMBER: 1997(06):5122 CEABA-VTB FILE SEGMENT V

DOCUMENT NUMBER: CEABA: 1997:1997899

TITLE: Ruthenium **catalysts** for **ammonia** synthesis at high pressures: **preparation**, characterization, and power-law kinetics

AUTHOR: Muhler, M.; Rosowski, F.; Hornung, A.; Hinrichsen, O.; Herein, D.; Ertl, G. (Fritz Haber Inst. Max Planck Gesellschaft, Berlin D 14195, Germany)

SOURCE: Appl. Catal., A (1997) 151(2), p.443-460
CODEN: ACAGE4 ISSN: 0926-860X

DOCUMENT TYPE: Journal
LANGUAGE: English

AB Supported ruthenium **catalysts** were prepared from ruthenium carbonate and high-purity magnesia and alumina. Alkali promotion was obtained by aqueous impregnation with alkali nitrates and by two non-aqueous methods based on alkali carbonates. The **catalysts** were characterized by hydrogen chemisorption, TEM and X-ray diffraction. The power-law rate expressions for ammonia synthesis were derived at atmospheric pressure and at 20 bar. The interaction of the alkali promoter with the ruthenium metal **particles** was also studied.

L44 ANSWER 24 OF 28 CEABA-VTB COPYRIGHT 2003 DECHEMA

ACCESSION NUMBER: 1987(00):2570 CEABA-VTB FILE SEGMENT V

DOCUMENT NUMBER: CEABA: 1987:208894

TITLE: **Ammonia** synthesis over supported iron **catalyst** prepared from amorphous iron-zirconium precursor. I. Bulk structural and surface chemical changes of precursor during its transition to the active **catalyst**
Ammoniaksynthese ueber aus amorphem Eisen-Zirkonium-Precursor dargestelltem Eisen-Traegerkatalysator. I. Untersuchung der bulk-Phase und der Oberflaeche waehrend des Ueberganges vom Precursor zum aktiven Katalysator

AUTHOR: Baiker, A.; Schloegl, R.; Armbruster, E.; Guentherodt, H.J.

SOURCE: J. Catal. (1987) 107(1), p.221-231, 8f,1t,19l
CODEN: JCTLA5 ISSN: 0021-9517

DOCUMENT TYPE: Journal
LANGUAGE: English

AB Active **ammonia** synthesis **catalysts** were prepared by in situ activation of amorphous Fe₉₁Zr₉ precursors in a continuous tubular fixed-bed reactor. When exposed to ammonia synthesis conditions (690 K, stoichiometric feed, 9 bar) the initially almost inactive amorphous Fe₉₁Zr₉ starts to crystallize and undergoes a sequence of structural and chemical changes which after about 500 h onstream lead to a highly active and stable **catalyst**. This transformation of the in situ activation can be reduced drastically by exposing the precursor to an oxygen pulse at reaction temperature. The resulting stable active **catalyst** consists of iron **particles** which are stabilized by poorly crystalline nonstoichiometric ZrO_{2-x}. Two forms of iron can be distinguished: larger **particles** of well-crystallizing alpha-iron, and as a minority phase, small **particles** of disordered iron with a considerably larger lattice constant.

L44 ANSWER 25 OF 28 WPIDS (C) 2003 THOMSON DERWENT

ACCESSION NUMBER: 2000-162872 [15] WPIDS

DOC. NO. CPI: C2000-050996

TITLE: Supported **catalysts** containing at least one metal for the transformation of organic compound comprise metallic **particles** of controlled size and narrow distribution resulting in increased activity.

DERWENT CLASS: E19 H04 J04

INVENTOR(S): DIDILLON, B; PETIT-CLAIR, C; UZIO, D; PETIT, C C

PATENT ASSIGNEE(S): (INSF) INST FRANCAIS DU PETROLE

COUNTRY COUNT: 28

PATENT INFORMATION:

PATENT NO KIND DATE WEEK LA PG

EP 979673 A1 20000216 (200015)* FR 10
R: AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT
RO SE SI
FR 2782280 A1 20000218 (200017)
JP 2000061306 A 20000229 (200022) 7
CN 1244446 A 20000216 (200027)
US 2001036902 A1 20011101 (200168)
US 2002028744 A1 20020307 (200221)
US 6482997 B2 20021119 (200280)

APPLICATION DETAILS:

PATENT NO	KIND	APPLICATION	DATE
EP 979673	A1	EP 1999-401925	19990727
FR 2782280	A1	FR 1998-10347	19980812
JP 2000061306	A	JP 1999-227164	19990811
CN 1244446	A	CN 1999-117734	19990812
US 2001036902	A1 Div ex	US 1999-373228	19990812
		US 2000-726031	20001130
US 2002028744	A1 Cont of	US 1999-373228	19990812
	CIP of	US 2000-726031	20001130
		US 2001-780610	20010212
US 6482997	B2 Div ex	US 1999-373228	19990812
		US 2000-726031	20001130

PRIORITY APPLN. INFO: FR 1998-10347 19980812

AB EP 979673 A UPAB: 20000323

NOVELTY - The **catalyst** is prepared from a colloid suspension of a metal oxide which is then deposited on a support and reduced to metal. By this means an increased activity of the **catalyst** is obtained.

DETAILED DESCRIPTION - The **catalyst** comprises a support and at least one metal, the metallic **particles** being of mean **size** greater than 1 nm. More than 80% of the particles are in the range D plus or minus (D.O.2) where D is the main **particle size**.

INDEPENDENT CLAIMS are also included for the preparation of the **catalyst** and its uses.

USE - The **catalysts** are used in hydrogenation of compounds comprising acetylenic, olefinic, aromatic. ketones, aldehydic etc. functions, hydrogenation of CO to 1 - 6C alcohols, isomerisation, hydroisomerisation or hydrogenolysis.

ADVANTAGE - The method of preparation of the **catalyst** ensures a lowering of the interaction between the metal and support compared to **catalysts** prepared by conventional methods, which leads to an increased activity and gain in performance.
Dwg.0/0

L44 ANSWER 26 OF 28 WPIDS (C) 2003 THOMSON DERWENT

ACCESSION NUMBER: 1994-046199 [06] WPIDS

DOC. NO. CPI: C1994-021108

TITLE: **Catalytic prepn. of ammonia**
from molecular nitrogen and hydrogen - with iron-based
micronised suspended **catalyst**, in
column reactor.

DERWENT CLASS: E35 J04

INVENTOR(S): PETCU, R; RUSNAC, L; SIMANDAN, T; VLADEA, R

PATENT ASSIGNEE(S): (INTR-N) GRUPUL INTR GOSPODARIE COMUNALA; (TRAG) TRAIAN
VUIA INST POLITEHNIC

COUNTRY COUNT: 1
PATENT INFORMATION:

PATENT NO	KIND	DATE	WEEK	LA	PG
RO 105505	A	19930130	(199406)*		

APPLICATION DETAILS:

PATENT NO	KIND	APPLICATION	DATE
RO 105505	A	RO 1988-136551	19881219

PRIORITY APPLN. INFO: RO 1988-136551 19881219
AB RO 105505 A UPAB: 19940322

Ammonia is **prepd.** by **catalytic** hydrogenation of molecular nitrogen. A **catalyst** ensuring superior conversion comprises a solid soln. in Fe of one or several of the following cpds: Al, K, Mn, Mg, Si, Mo, SiO₂, Al₂O₃, MgO, with an Fe concn. of 50-99%; 10-40% finely divided **catalyst** of 5-100 microns **particle size** is suspended in a liq. of 0.1-100 CP dynamic viscosity.

The suspending agent is opt. liq. paraffin, aromatic hydrocarbons, neopentyl-glycol-neo-acid-esters, hexane, cyclo-hexane. The **catalyst** is contacted with nitrogen and hydrogen in a (1:3)-(1:4) ratio in a column type reactor; recirculated externally. The reactor contains static mixing elements.

L44 ANSWER 27 OF 28 WPIDS (C) 2003 THOMSON DERWENT
ACCESSION NUMBER: 1986-077119 [12] WPIDS
DOC. NO. CPI: C1986-032834
TITLE: **Prepn.** of iron-based **catalyst** for **ammonia** synthesis - by **rapid** cooling of a magnetite metal oxide promoter mixt..
DERWENT CLASS: E35 J04
INVENTOR(S): FERRERO, F; GENNARO, A; PERNICONE, N
PATENT ASSIGNEE(S): (FERT-N) FERTIMONT SPA
COUNTRY COUNT: 15
PATENT INFORMATION:

PATENT NO	KIND	DATE	WEEK	LA	PG
EP 174716	A	19860319	(198612)*	EN	19
R: AT BE CH DE FR GB LI NL SE					
DK 8502744	A	19851220	(198612)		
JP 61011148	A	19860118	(198612)		
NO 8502458	A	19860113	(198617)		
US 4789657	A	19881206	(198851)		
CA 1251196	A	19890314	(198915)		
IT 1174207	B	19870701	(199025)		

APPLICATION DETAILS:

PATENT NO	KIND	APPLICATION	DATE
EP 174716	A	EP 1985-304355	19850618
US 4789657	A	US 1987-112051	19871023

PRIORITY APPLN. INFO: IT 1984-21482 19840619
AB EP 174716 A UPAB: 19930922

Fe-based **catalyst** for the synth. of NH₃ is prepd. as follows: a mixt. of magnetite (I) (or a mixt. of Fe oxides having the compsn. of (I)) and 1-10% by wt. of one or more metal oxide promoters (II) is melted, cooled at greater than 25 deg.C/min., then reduced to the required **particle size**.

Pref. cooling of the melt is pref. at 100-1600 deg.C/min. in the range 1700-700 deg.C. Cooling may be effected by pouring the melt into Fe vessel(s) the bottom of which consists of Fe bricks having thickness to obtain max. heat dispersion (pref. at least 4 cm), or by quenching the melt in air or H₂O. The prepd. **catalyst** has a reticular structure of the (I) crystallites, surrounded by promoter oxides, of size 10-100 esp. 10-40 microns.

USE/ADVANTAGE - Use of high cooling rates of the molten **catalysts** affords a **catalyst** for the commercial-scale synth of NH₃ which is far more active than commercial **catalysts**.
0/1

L44 ANSWER 28 OF 28 WPIDS (C) 2003 THOMSON DERWENT

ACCESSION NUMBER: 1976-73652X [39] WPIDS

TITLE: **Ammonia synthesis catalyst**

prepn - by heating iron oxide based mixt contg **promome** and granulating by moulding individual granules.

DERWENT CLASS: E35 J04

PATENT ASSIGNEE(S): (VORO-I) VORONTSEV S P

COUNTRY COUNT: 1

PATENT INFORMATION:

PATENT NO	KIND	DATE	WEEK	LA	PG
SU 487663	A	19760312	(197639)*		

PRIORITY APPLN. INFO: SU 1973-1960736 19730913

AB SU 487663 A UPAB: 19930901

Ammonia synthesis **catalyst** bases on iron oxides and contg. promoters is prepd. by heating required compsn. to 2000-2500 degrees C. Then granulating, cooling the granules. High activity **catalyst** is prepd. more safely in the compsn., is granulated in dies corresponding to the size of the granules using point source heating, e.g., argon arc flame burner. In an example, 90.5 kg. synthetic magnetite, obtd. by the oxidn. of Fe in oxygen, contg. Fe₃O₄, is fragmented to 1-2 mm. **particle size** and mixed 3 kg. CaO, 4 kg. Al₂O₃, 1 kg. SiO₂ and 1.5 kg. K₂SO₃ and the 100 kg. mixt. was heated in 16 dies contg. 10 mm. spaces contg. 3 g. molten mass at 2000 degrees C and elevated pressure giving crystalline structure granules on cooling.

=> file home

FILE 'HOME' ENTERED AT 14:59:50 ON 12 JUN 2003